

## WHAT IS CLAIMED IS:

## 1. An image coding apparatus, comprising:

a coding circuit which codes an image signal to be coded, by using intra-frame coding scheme and/or inter-frame coding scheme; and

a reference mode selection circuit which sets selectively either a reference mode that uses a bidirectional coding in which a past frame and a future frame are referred to or a reference mode that does not use the bidirectional coding, as the inter-frame coding scheme, according to an coding execution environment in said apparatus.

2. An image coding apparatus according to Claim 1, wherein said reference mode selection circuit sets the reference mode, according to whether the reference mode that uses the bidirectional coding or the reference mode that does not use the bidirectional coding is more suitable for the coding execution environment in said apparatus, with reference to a level of compression ratio.

3. An image coding apparatus according to Claim 1, wherein said reference mode selection circuit sets the reference mode, according to whether the reference mode that uses the bidirectional coding or the reference mode that does not use

the bidirectional coding is more suitable for the coding execution environment in said apparatus, with reference to a level of load caused by a coding processing.

4. An image coding apparatus according to Claim 1, wherein said reference mode selection circuit sets the reference mode, according to whether the reference mode that uses the bidirectional coding or the reference mode that does not use the bidirectional coding is more suitable for the coding execution environment in said apparatus, with reference to a level of advantage on specifications in a case when the bidirectional coding is performed on the image signal.

5. An image coding apparatus according to any one of Claims 1 to 4, wherein as the coding scheme said coding circuit codes the image signal by using a scheme complying with MPEG, in the reference mode that uses a bidirectional coding, the coding is performed using I pictures, P pictures and B pictures, and

in the reference mode that does not use the bidirectional coding, I pictures and P pictures are used.

6. An image pickup apparatus, comprising:

an image input unit which takes an image of an object and acquires an image signal;

a coding circuit which codes the acquired image signal

by using intra-frame coding scheme and/or inter-frame coding scheme;

a reference mode selection circuit which sets selectively either a reference mode that uses a bidirectional coding in which a past frame and a future frame are referred to or a reference mode that does not use the bidirectional coding, as an inter-frame compressing and coding in the coding scheme, according to an coding execution environment in said apparatus; and

a data storage unit which stores coded data generated by the coding.

7. An image coding apparatus, comprising:

a predictive mode selector which outputs information indicating a predictive mode used to code a frame constituting moving images, at the time when the moving images are to be coded; and

a coding unit which codes the frame based on the information, indicating the predictive mode, outputted from said predictive mode selector,

wherein when the moving images are coded using a predictive mode containing an inter-frame bidirectional predictive mode, said predictive mode selector outputs information indicating that global motion compensation is used, as information indicating a predictive mode used to code a future reference frame of a frame which is coded in

the inter-frame bidirectional predictive mode.

8. An image coding apparatus according to Claim 7, wherein said predictive mode selector acquires a profile used for coding the moving images, and determines whether the inter-frame bidirectional predictive mode is contained or not, by referring to the profile.

9. An image coding apparatus according to Claim 7 or 8, wherein when the information indicating that global motion compensation is used is outputted from said predictive mode selector, said coding unit codes a part whose motion vector is a zero vector in the forward inter-frame predictive mode, using a global motion vector.

10. An image coding apparatus according to Claim 7 or 8, wherein when the information indicating that global motion compensation is used is outputted from said predictive mode selector, said coding unit codes a part whose motion vector is a zero vector in the forward inter-frame predictive mode and whose difference data from a reference frame is practically zero, using the global motion compensation.

11. An image coding apparatus according to any one of Claims 7 to Claim 10, wherein when the future reference frame of a frame which is coded in the inter-frame bidirectional

predictive mode is a P frame, said predictive mode selector outputs information indicating that said frame is coded as an S frame including a global motion vector, instead of the P frame, as information indicating a predictive mode used to code said frame.

12. An image coding apparatus according to any one of Claims 7 to Claim 11, wherein, for all frames which should have been coded as P frames, said predictive mode selector outputs information indicating that said frame is coded as an S frame including a global motion vector, instead of the P frame, as information indicating a predictive mode used to code said frame.

13. An image coding method, comprising:

outputting information indicating a predictive mode used to code a frame constituting moving images, at the time when the moving images are to be coded; and

coding the frame based on the information indicating the predictive mode,

wherein when the moving images are coded using a predictive mode containing an inter-frame bidirectional predictive mode, said outputting outputs information indicating that global motion compensation is used, as information indicating a predictive mode used to code a future reference frame of a frame which is coded in the

inter-frame bidirectional predictive mode.

14. An image coding apparatus in which, at the time of coding moving images, coding is performed, per frame that constitutes the moving image, based on any mode among an intra-frame coding mode, an inter-frame unidirectional predictive coding mode and an inter-frame bidirectional predictive coding mode, so as to generate a coded data sequence of the moving images, the apparatus characterized in that:

when the moving images are coded using a predictive mode containing the inter-frame unidirectional predictive coding mode and the inter-frame bidirectional predictive coding mode, and it is determined that, in a frame coded in the inter-frame unidirectional predictive coding mode, a certain block constituting said frame is practically the same as a block, placed at the same position as the certain block, which lies in a reference frame on which a prediction is based, the coding is performed in a manner that information of a motion vector with the reference frame, instead of a flag indicating the determination, is appended into a coded data sequence of the block.

15. An image coding apparatus according to Claim 14, wherein when a frame existing between the inter-frame unidirectional predictive coding mode and the reference frame is coded in

the inter-frame bidirectional predictive mode, the coding is also performed on the block at the same position as the block to which the motion vector information has been appended, and a coding parameter is appended into a coded data sequence.

16. An image coding apparatus according to Claim 14 or 15, wherein the frame coded in the inter-frame unidirectional predictive coding is a reference frame for the frame coded in the inter-frame bidirectional predictive mode.

17. An image coding apparatus according to any one of Claims 14 to 16, wherein the motion vector information is coded as a zero vector.

18. An image coding apparatus, comprising:

a coding mode control unit which outputs information indicating a coding mode used to code a frame, per frame that constitutes moving images, at the time of coding the moving images; and

a coding unit which codes the frame, based on the information, indicating a coding mode, outputted from said coding mode control unit,

wherein when said coding unit codes a future reference frame of a frame coded in an inter-frame bidirectional predictive mode, it determines, per block that constitutes

this frame, whether or not a block is practically the same as a block, placed at the same position as said block, which lies in a reference frame on which a prediction is based, and it counts the number of blocks that have been determined to be practically the same, and

wherein when, as information indicating a coding mode used to code the future reference frame of the frame coded in the inter-frame bidirectional predictive mode, the number of blocks that have been determined to be practically the same is greater than or equal to a prescribed threshold value, said coding mode control unit outputs information indicating that the blocks that have been determined to be the same are coded using global motion compensation; and when the number of blocks that have been determined to be practically the same is less than the prescribed threshold value, said coding mode control unit outputs information indicating that the coding is performed, on the blocks that have been determined to be practically the same, by appending information, on a motion vector with the reference frame, to a coded data sequence of said block.

19. An image coding apparatus for generating a coded data sequence by coding moving images, the apparatus comprising:

a coding unit which codes a frame that constitutes the moving images;

a coding method decision unit which determines whether



a block in a frame, to be coded, corresponding to a block of a future reference frame is processed as a copy of a prescribed block of a past reference frame when, at the time of coding by said coding unit the frame to be coded in an inter-frame bidirectional predictive mode, a certain block of the future reference frame that the frame to be coded refers to in a backward direction is coded using a flag indicating that the future reference frame is a copy of a prescribed block of a past reference frame that the future reference frame refers to in a forward direction; and

an appending unit which appends flag information indicative of a decision result of said coding method decision unit, into the coded data sequence.

20. An image coding apparatus according to Claim 19, wherein when said coding method decision unit determines that the block in the frame to be coded shall not be processed as the copy of a prescribed block of a frame of the past reference frame, said coding unit codes difference data between the prescribed block of the past reference frame and the block in the frame to be coded.

21. An image coding apparatus according to Claim 19 or 20, wherein said coding method decision unit determines based on difference data between the block in the frame to be coded and the prescribed block of the past reference frame.

22. An image coding apparatus according to any one of Claims 19 to 21, wherein said appending unit appends the flag information to the coded data of the frame to be coded or the coded data of the block in the frame to be coded.

23. An image coding apparatus according to any one of Claims 19 to 21, wherein said appending unit appends the flag information to the coded data of the future reference frame or coded data of the block of the future reference frame.

24. An image coding apparatus according to any one of Claims 19 to 21, wherein said appending unit appends the flag information to a sequence header of the coded data sequence.

25. An image decoding apparatus, comprising:

- a decoding unit which acquires and decodes a coded data sequence in which moving images are coded; and

- a decoding method decision unit which acquires flag information, appended to a prescribed position of the coded data sequence, indicating whether a block of a targeted frame coded in an inter-frame bidirectional predictive mode is processed as a copy of a prescribed block of a past reference frame that the targeted frame refers to in a forward direction or not and which determines a decoding method,

wherein when said decoding method decision unit determines that the block of the targeted frame is processed as the copy of the prescribed block of the past reference frame, said decoding unit copies the prescribed block of the past reference frame; and when said decoding method decision unit determines that the block of the targeted frame is not processed as the copy of the prescribed block of the past reference frame, said decoding unit decodes difference data between the block of the targeted frame and the prescribed block of the past reference frame.

26. An image coding method for generating a coded data sequence by coding moving images, the method comprising:

coding a frame that constitutes the moving images;

determining whether a block in a frame, to be coded, corresponding to a block of a future reference frame is processed as a copy of a prescribed block of a past reference frame when, at the time of coding by said coding the frame to be coded in an inter-frame bidirectional predictive mode, a certain block of the future reference frame that the frame to be coded refers to in a backward direction is coded using a flag indicating that the future reference frame is a copy of a prescribed block of the past reference frame that the future reference frame refers to in a forward direction; and

appending flag information indicative of a decision

result, into the coded data sequence.

27. An image decoding method, comprising:

acquiring and decoding a coded data sequence in which moving images are coded; and

acquiring flag information, appended to a prescribed position of the coded data sequence, indicating whether a block of a targeted frame coded in an inter-frame bidirectional predictive mode is processed as a copy of a prescribed block of a past reference frame that the targeted frame refers to in a forward direction or not and determining a decoding method,

wherein when it is determined in said determining that the block of the targeted frame is processed as the copy of the prescribed block of the past reference frame, said decoding copies the prescribed block of the past reference frame; and when it is determined in said determining that the block of the targeted frame is not processed as the copy of the prescribed block of the past reference frame, said decoding decodes difference data between the block of the targeted frame and the prescribed block of the past reference frame.

28. A data structure of a coded data sequence in which moving images have been coded, the data structure including flag information indicating whether a block of a first frame

coded in an inter-frame bidirectional predictive mode is processed as a copy of a prescribed block of a second frame that the first frame refers to in a forward direction or difference data between the block of the first frame and the prescribed block of the second frame are decoded wherein the flag information is provided at a prescribed position of the coded data sequence.